

WINDS OF CHANGE

2016-2026 GLOBAL FLEET &
MRO MARKET FORECAST

OCTOBER 19, 2016

Tom Cooper
Vice President



OLIVER WYMAN

CAVOK

A DIVISION OF OLIVER WYMAN

Oliver Wyman's Aviation, Aerospace & Defense practice is the largest and most capable consulting team dedicated to the industry



OUR EXPERIENCE

- 232 professionals across Europe and North America
- Deep aviation knowledge and capabilities allow the practice to deliver data-driven solutions and provide strategic, operational, and organizational advice

OUR CLIENTS

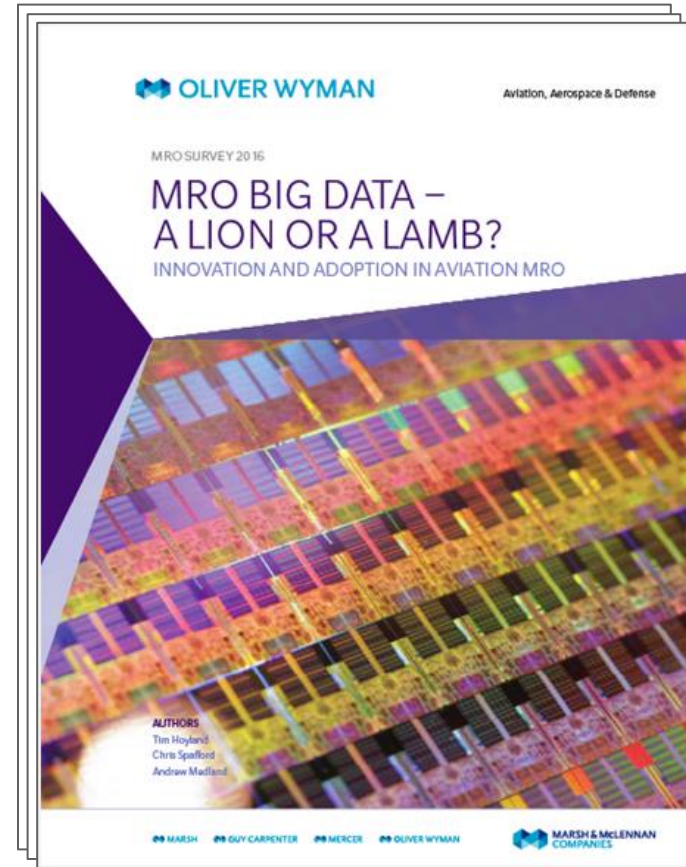
We have worked with more than $\frac{3}{4}$ of the industry's Fortune 500 companies, including:

- All major US airlines
- Leading airlines, MROs, OEMs, and independent parts manufacturers in the Americas, Europe, and Asia
- Dominant aerospace and defense firms

OUR APPROACH

Data-driven: unbiased benchmarking and forecasting tools to establish problems and identify solutions
Innovative: ideas that are forward-thinking
Actionable: results-oriented recommendations
Collaborative: an emphasis on working with our clients, alongside executives, management, and support teams

This presentation incorporates the betterinsight™ 2016-2026 Global Fleet and MRO Market Forecast and the Oliver Wyman MRO Survey 2016



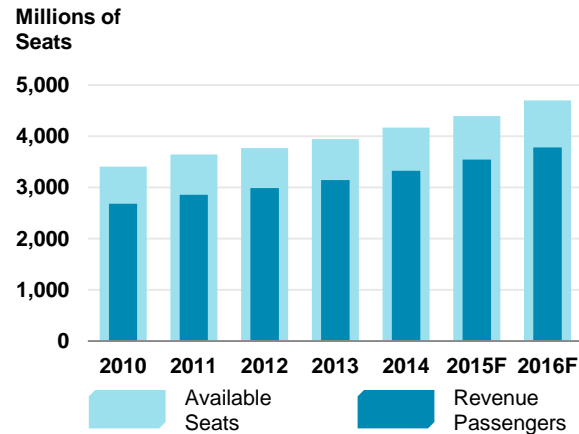
The betterinsight™ Global Fleet & MRO Market Forecast Commentary, and related market intelligence data is available at planestats.com/betterinsight



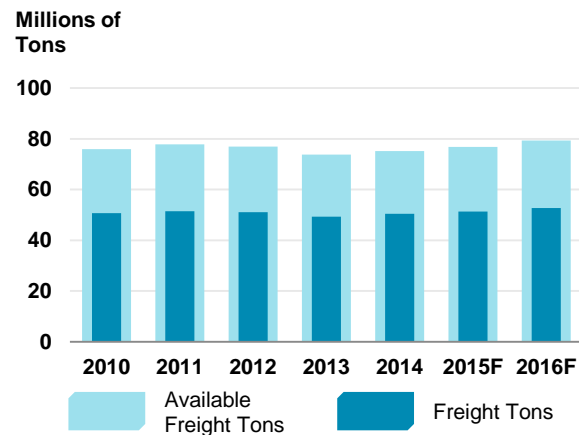
The future is now

Amid weakening economic conditions, the global airline industry is achieving record passenger volumes, record cargo volumes, and record net profits

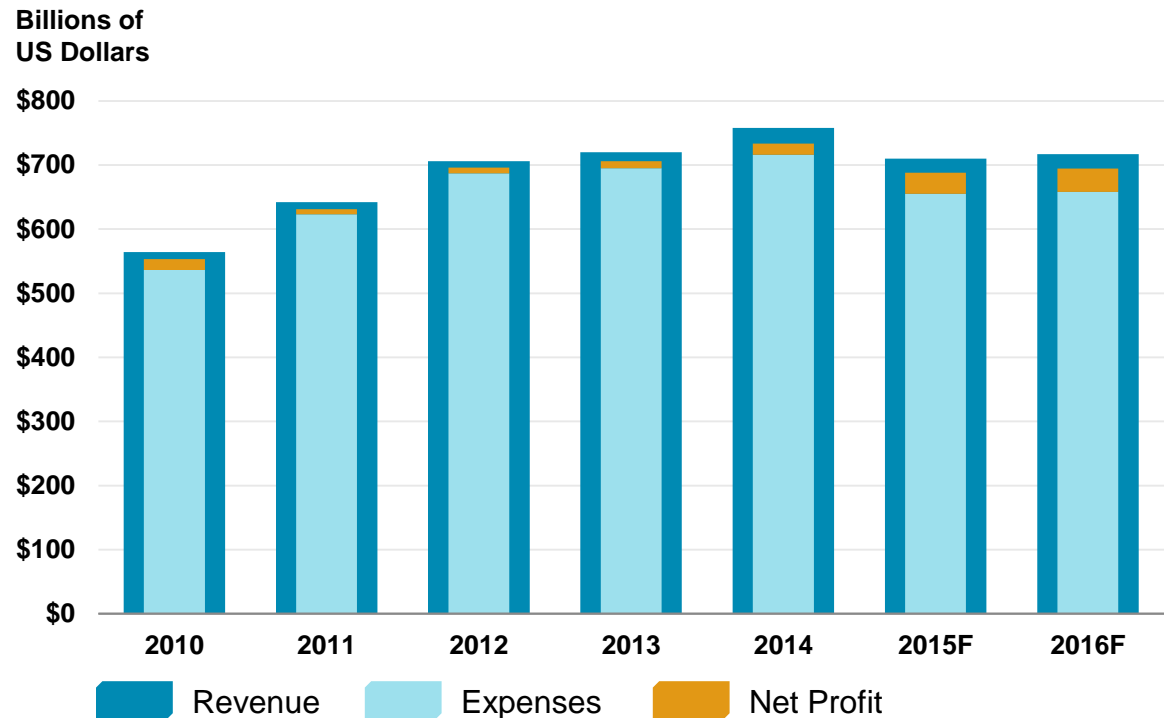
Global Air Transport Passenger Volume by Year



Global Air Transport Cargo Volume by Year



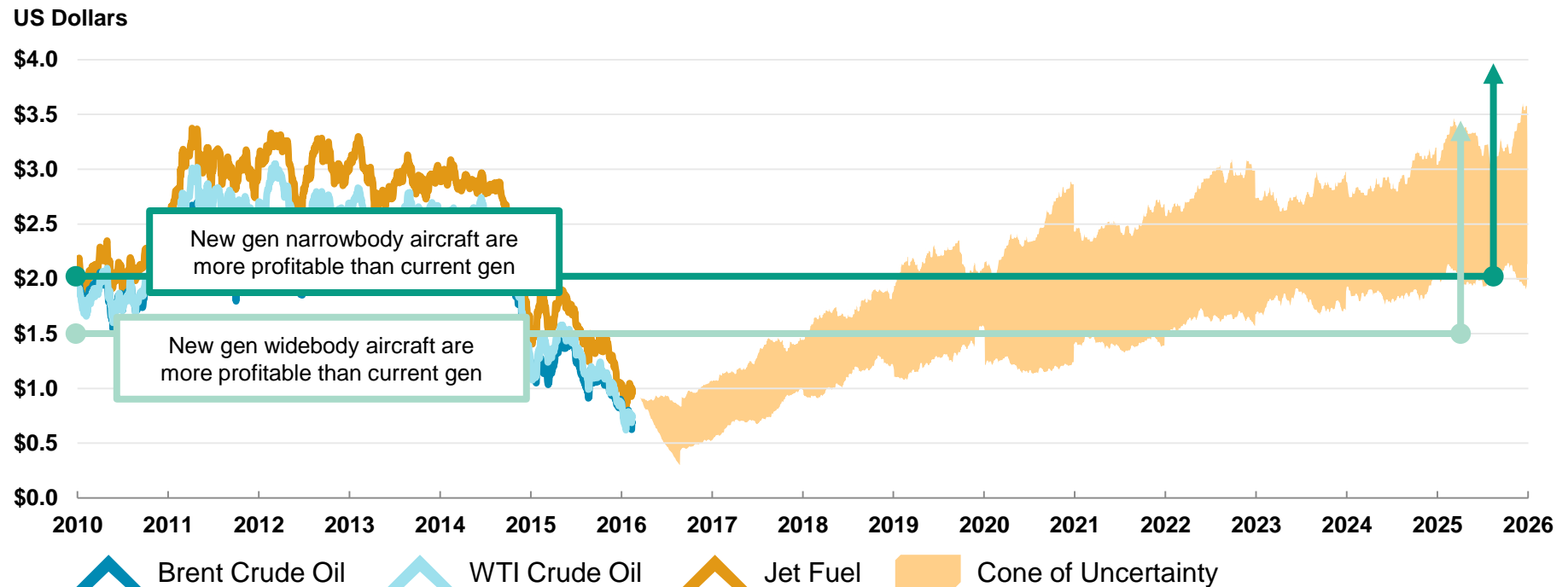
Global Air Transport Industry Financial Performance by Year



The North American operators are, by far, delivering the strongest financial performance

Record net profits are due in large part to the glut in the oil market. As oil prices are expected to remain low over the short term, many are concluding that operators will delay retirements, and defer new aircraft.

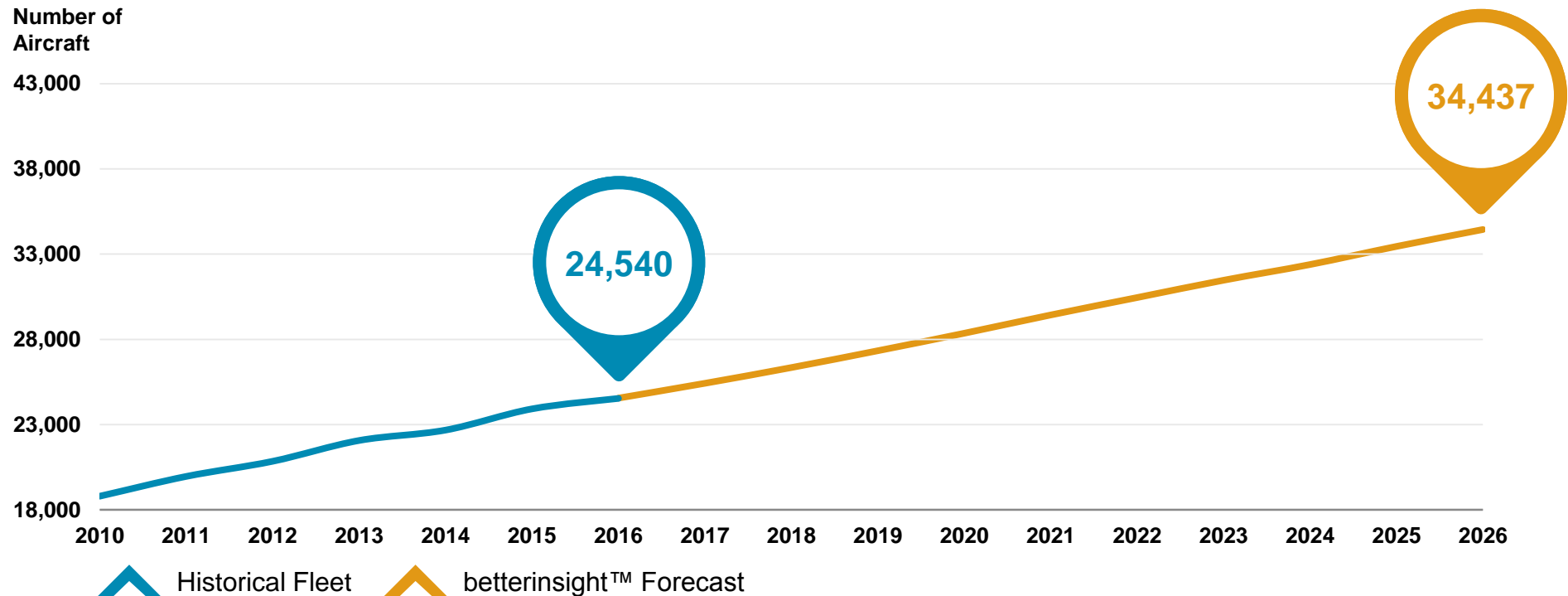
Crude Oil and Jet Fuel Spot Prices per Gallon
by Year



To date, operators have not shown signs of significantly altering fleet plans. OEM order backlogs continue to grow, and new aircraft deliveries are at an all time high.

While the fleet is growing at a healthy rate, and the industry is reveling in historic net profits, uncertainties surrounding economic growth, interest rates, and oil could disrupt the delicate balance we are enjoying today

Global In-Service Fleet Forecast by Year

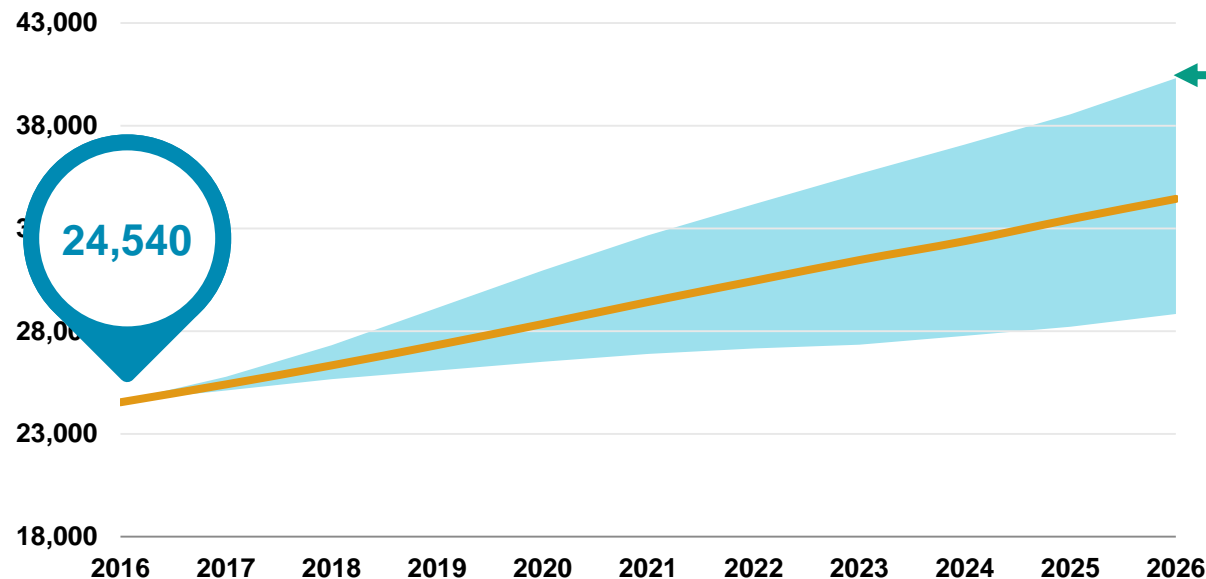






We forecast the fleet will increase by nearly 9,900 aircraft by 2026, representing an average annual growth rate of 3.4%

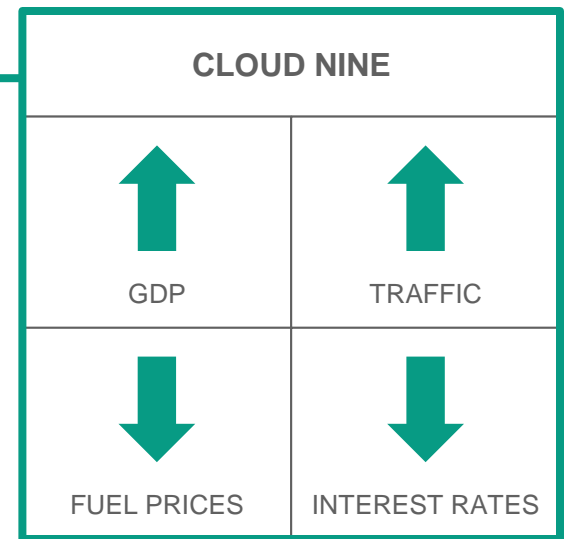
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Global In-Service Fleet Forecast by Year

Number of
Aircraft



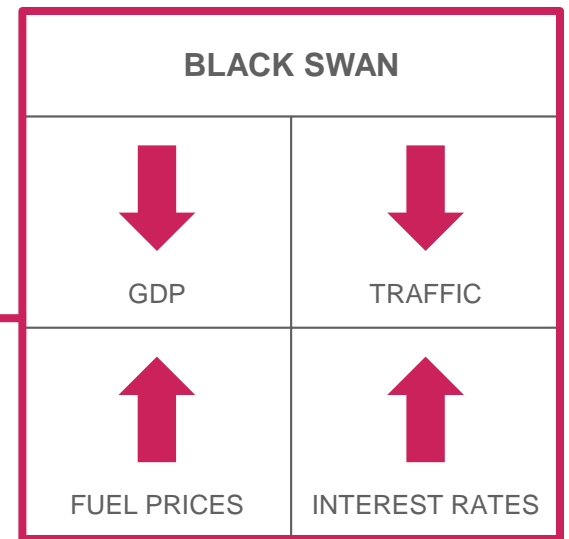
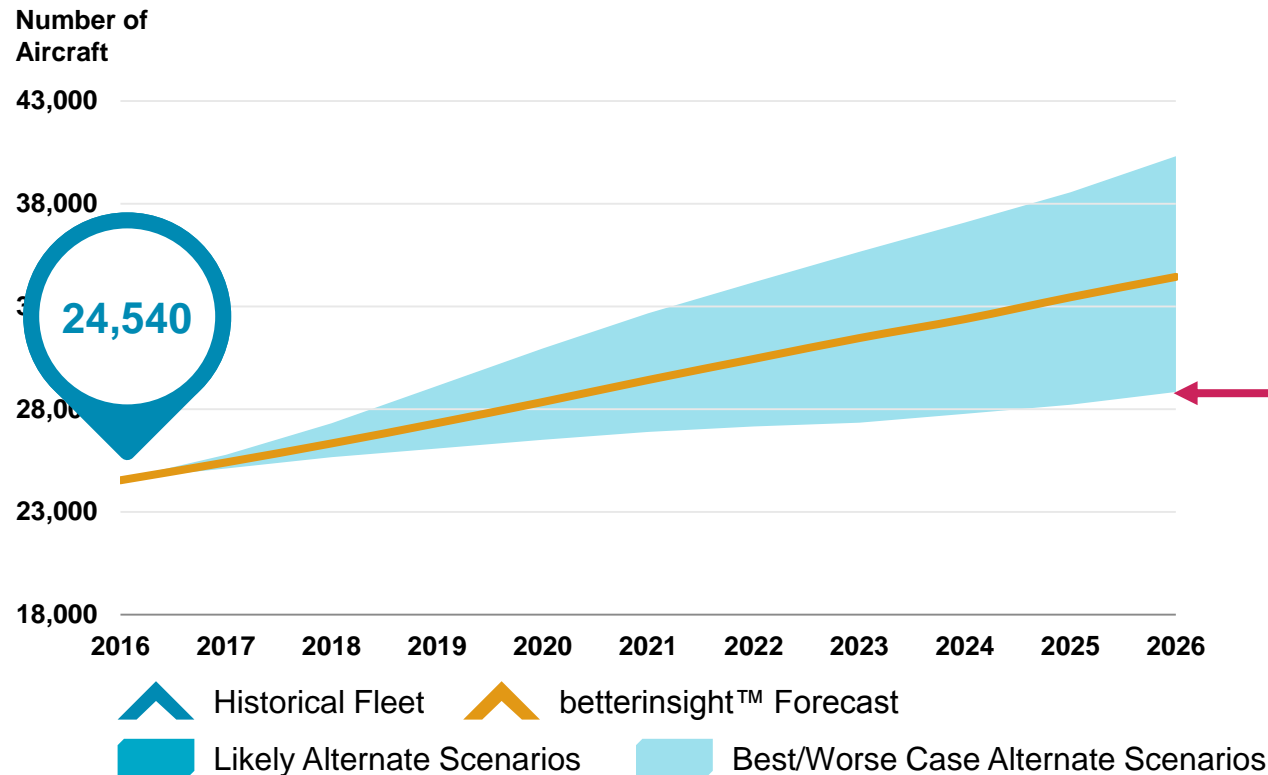
 Historical Fleet
  betterinsight™ Forecast
 Likely Alternate Scenarios
  Best/Worse Case Alternate Scenarios



No matter which forecast scenario comes to fruition, the winds of change are blowing through our industry

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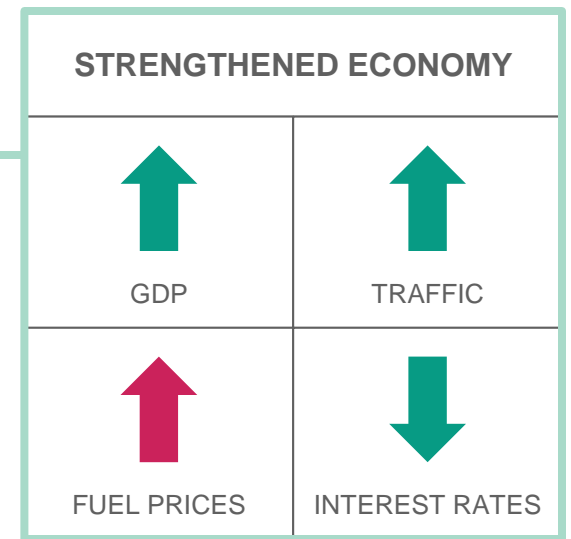
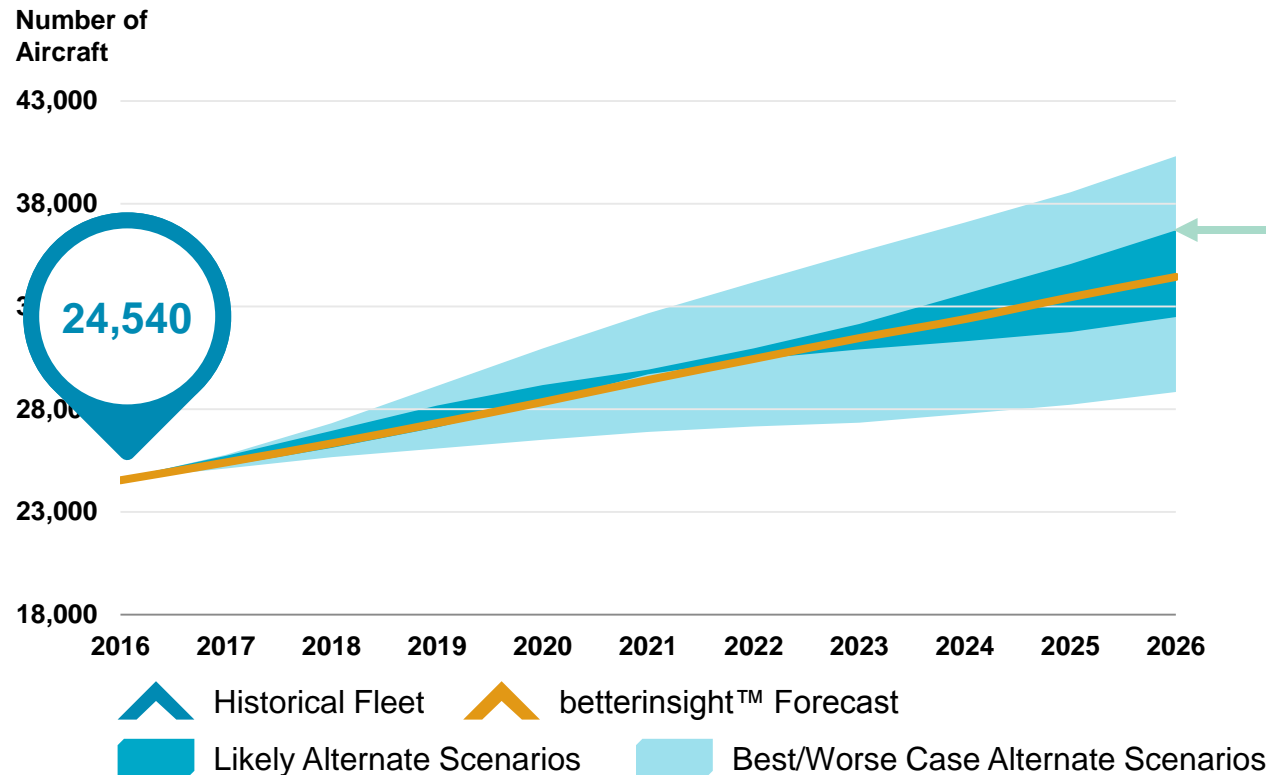
Global In-Service Fleet Forecast by Year



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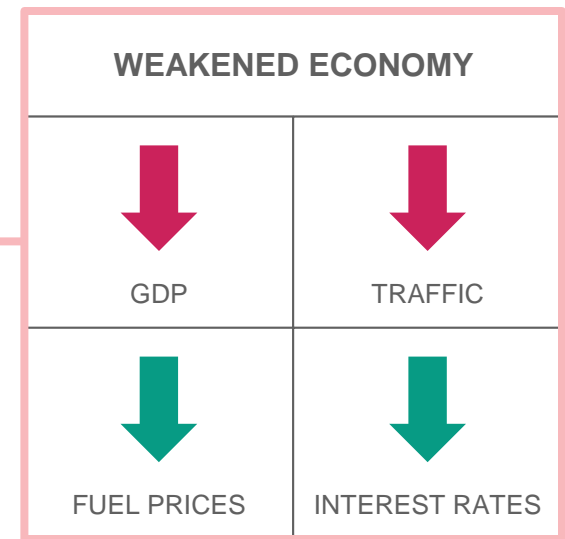
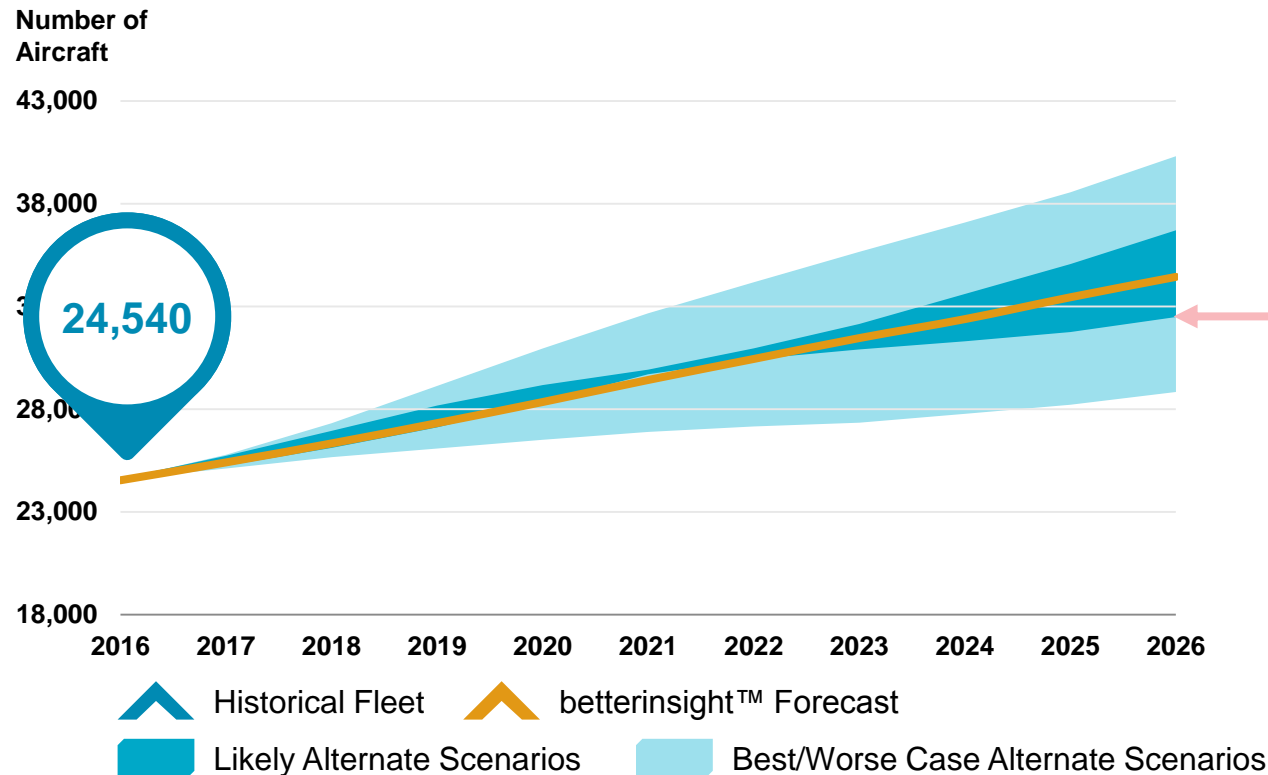
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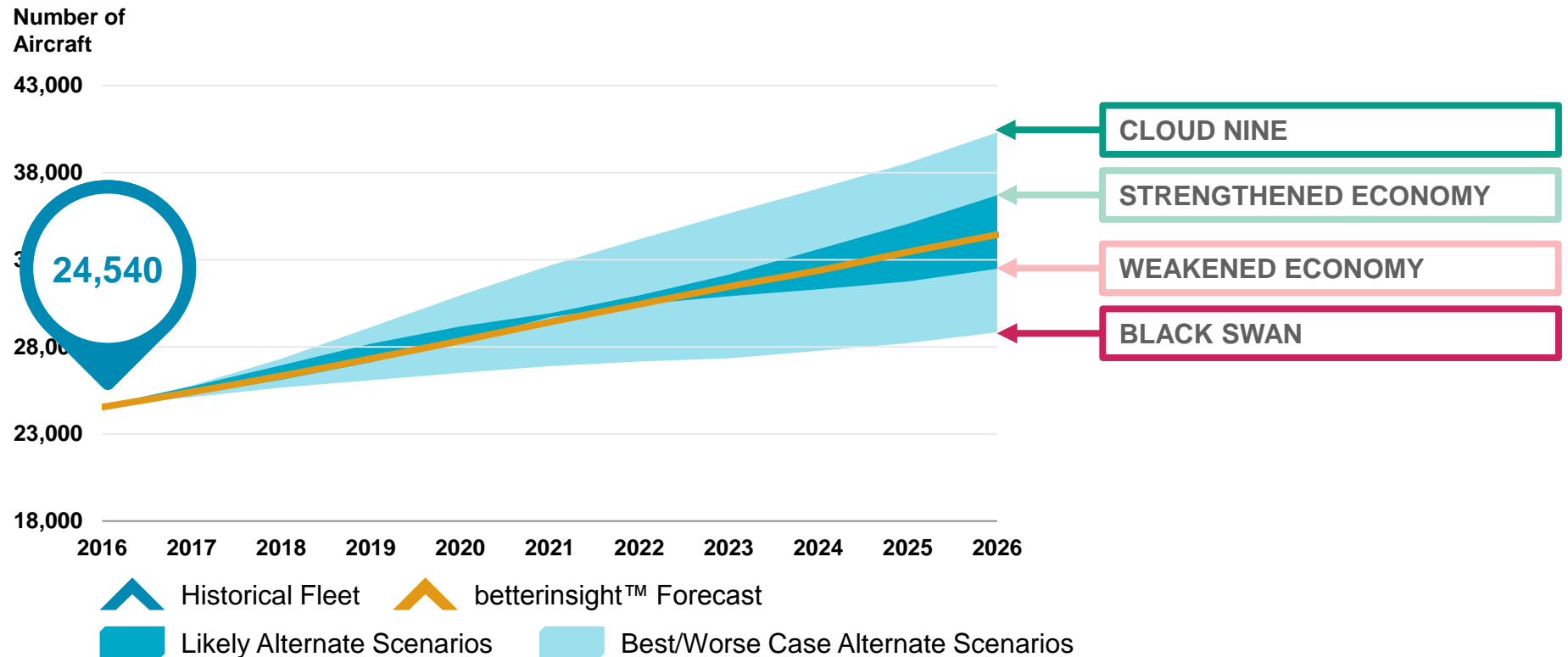
Global In-Service Fleet Forecast by Year



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Global In-Service Fleet Forecast by Year



No matter which forecast scenario comes to fruition, the winds of change are blowing through our industry



1

**New
Technology**

2

**Regional
Shift**

3

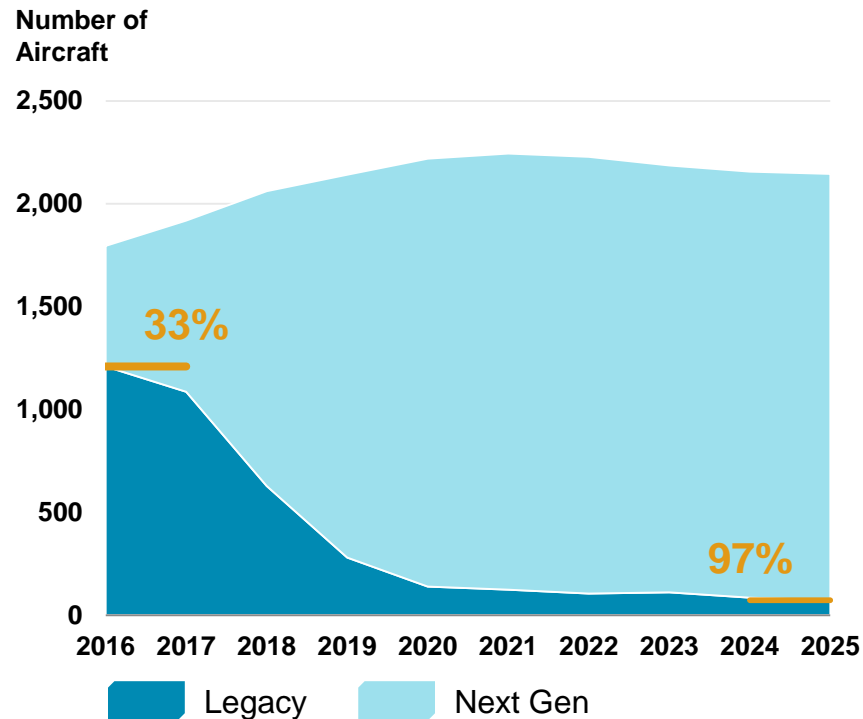
**Fleet
Mix**

4

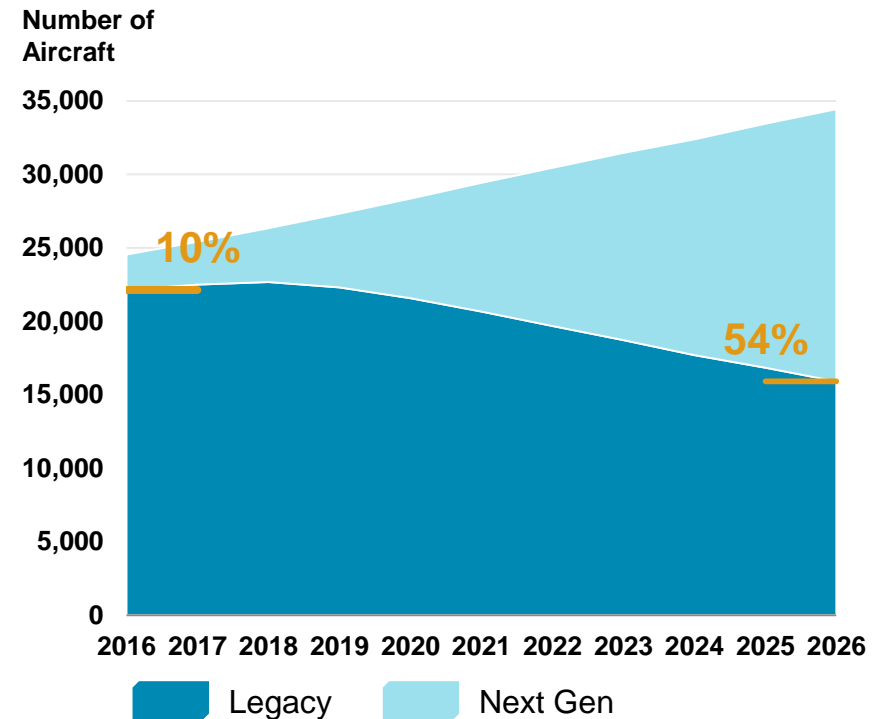
**Aircraft
Retirements**

The increase in new technology will be the prevailing tailwind behind the changes in the global fleet and the airline industry over the next decade

2016-2025 Global New Aircraft Delivery Forecast
Next Gen vs Legacy



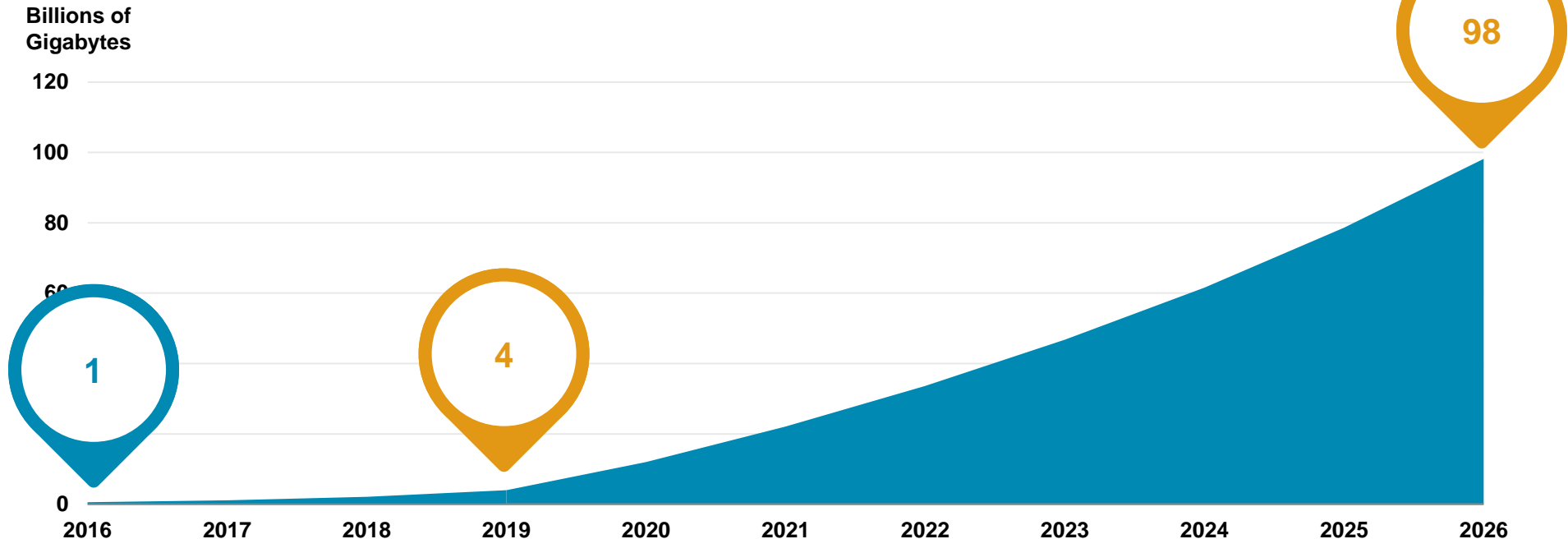
2016-2026 Global In-Service Fleet Forecast
Next Gen vs Legacy



By the end of the forecast period, next generation aircraft will account for nearly all new deliveries and comprise over half of the global fleet

Next generation aircraft are equipped with new technologies enabling unprecedented collection and transmission of data at both the system and part level

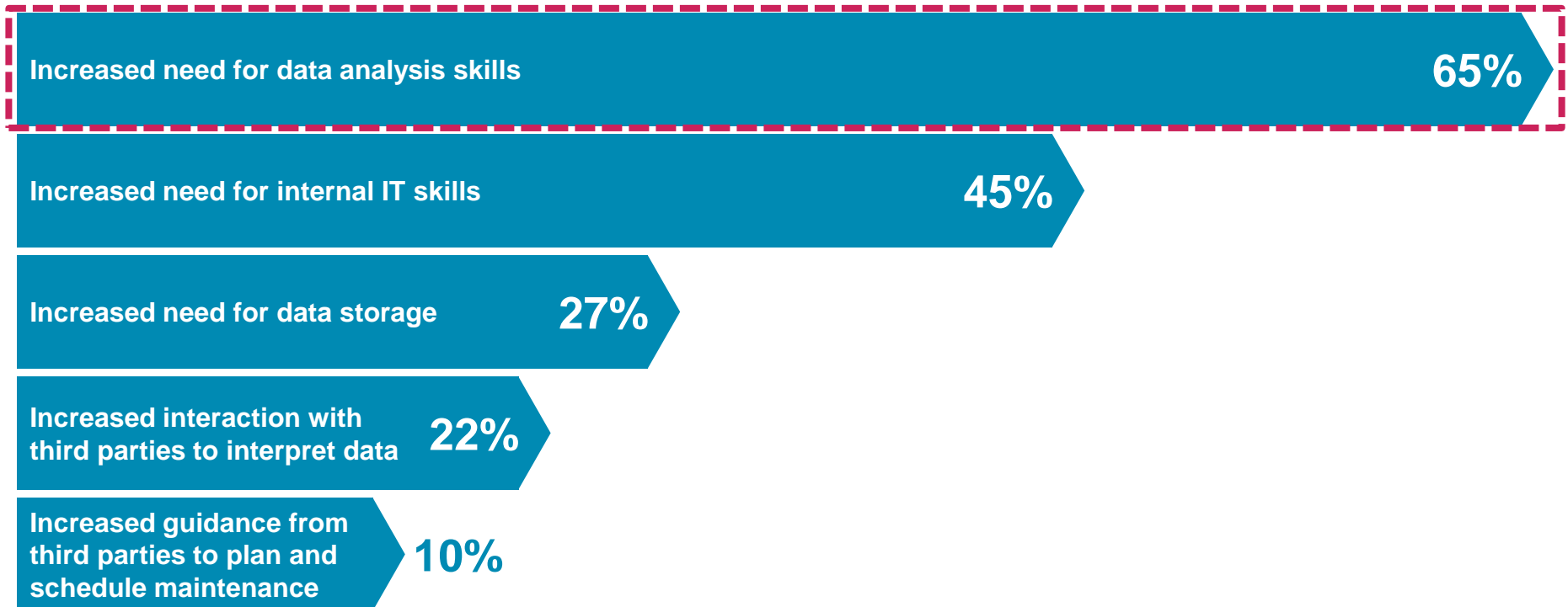
Global In-Service Fleet Data Generation per Year by Year



This surge of data, in the hands of a new breed of data scientists and innovative management teams, creates massive potential to change how aircraft are cared for

Without a clear plan for its collection and application, big data can bring distractions for resource-constrained operators, leading to squandered efforts or abandoned intentions to integrate advanced analytics into MRO

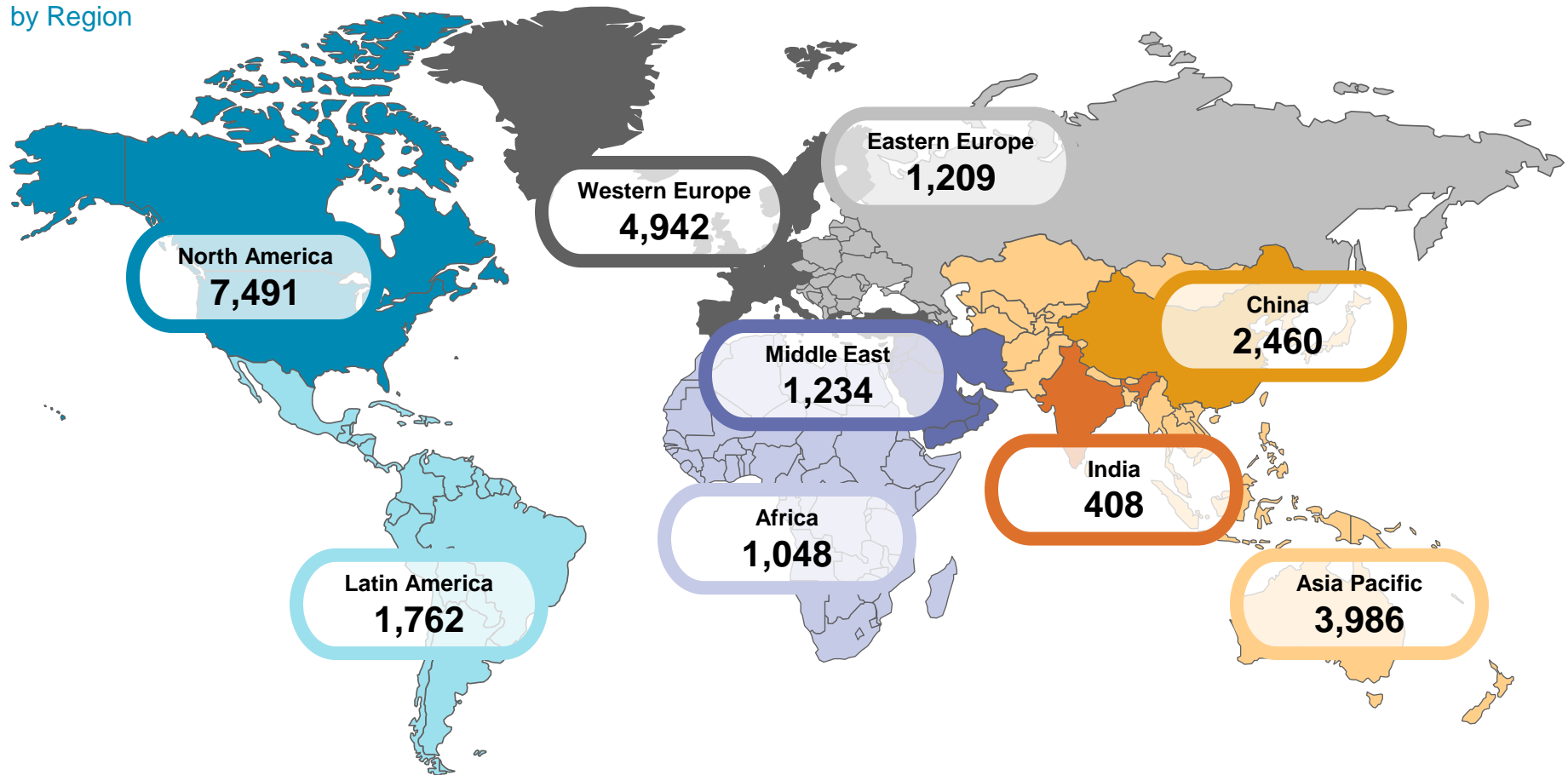
Q: “Due to aircraft health management we have experienced a noticeable...”



The pathway to a high-impact, productive big data platform will begin with targeted successes on modest improvement initiatives, such as statistically reliability analysis on high-failure parts

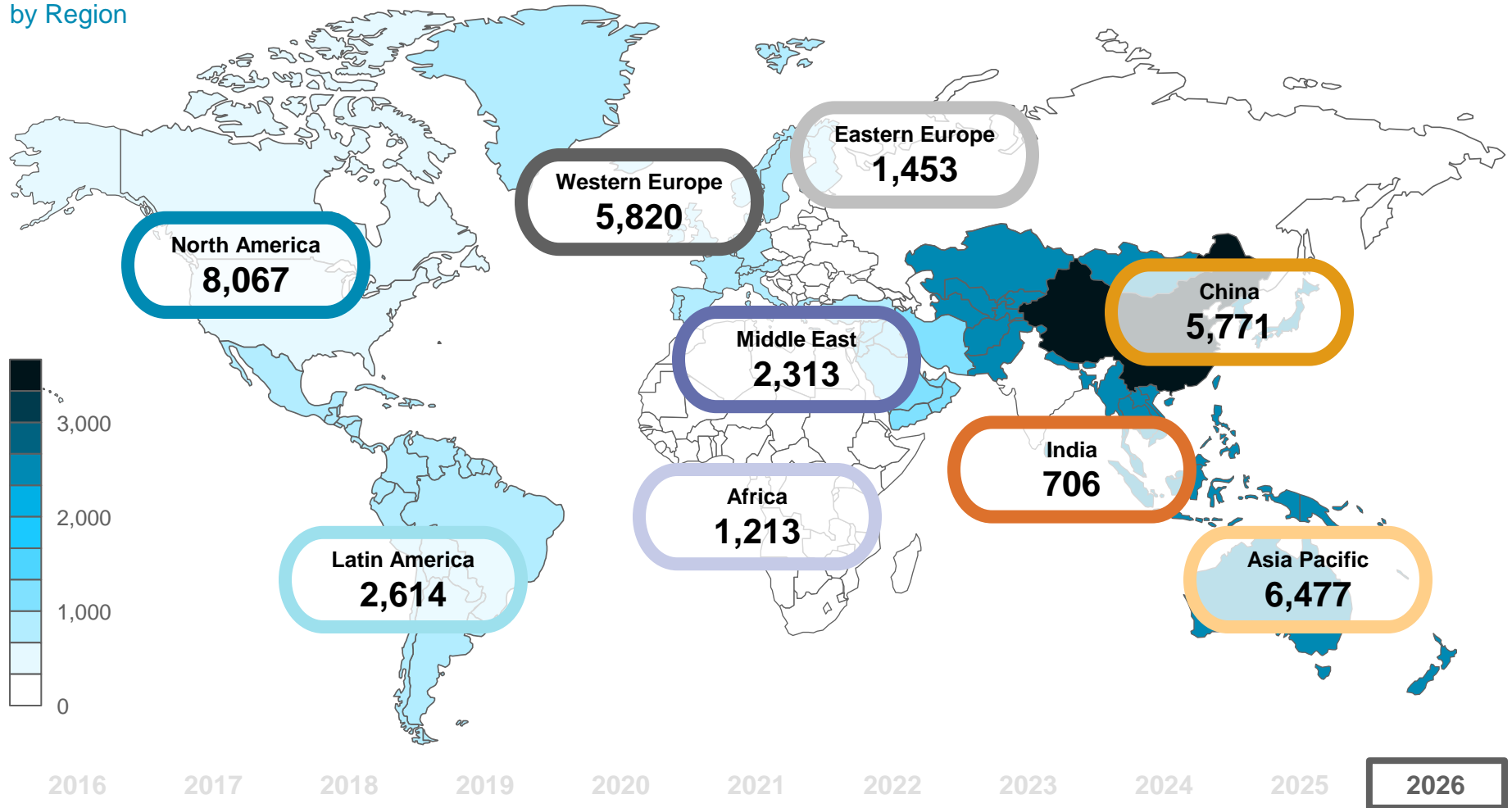
As the mature North American and Western European markets continue to undergo significant re-fleeting efforts and tightly control capacity, there will be boisterous shift towards Asia

2016 In-Service Fleet
by Region



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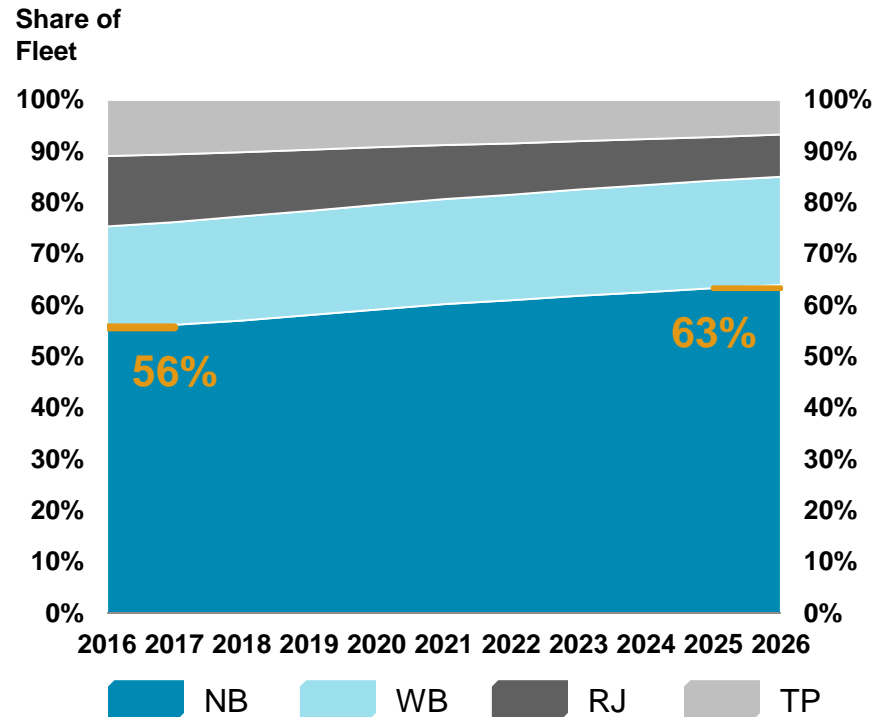
2026 In-Service Fleet
by Region



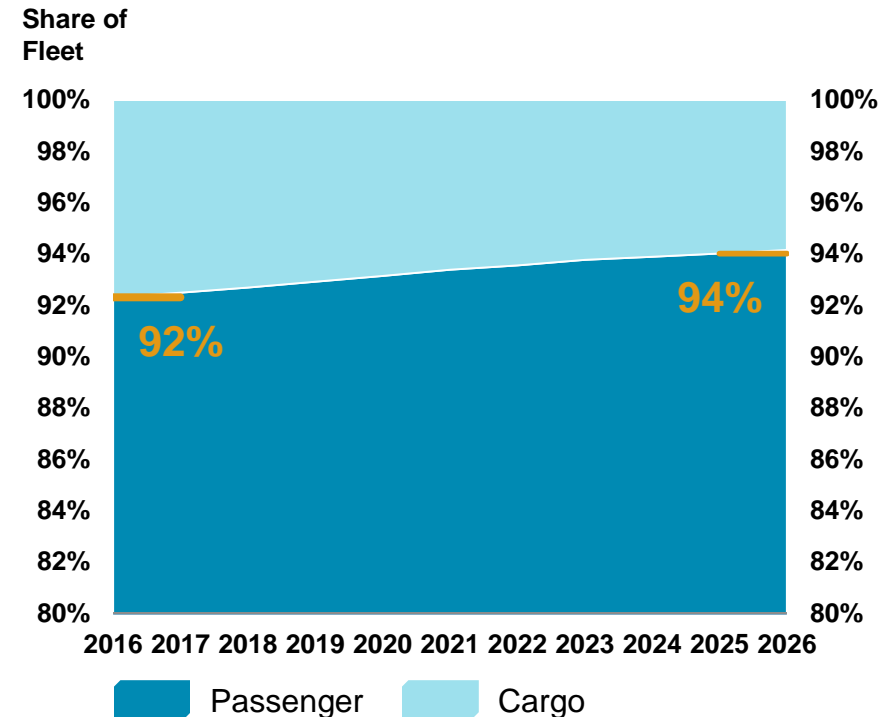
*If you are thinking about **growth**,
you should be thinking about **Asia***

Seeking to mitigate the financial risk from historically volatile fuel prices and to operate more efficiently, operators around the world are discarding smaller regional jets and turboprops to move up to narrow-body aircraft

2016-2026 Global Fleet Forecast by Aircraft Class



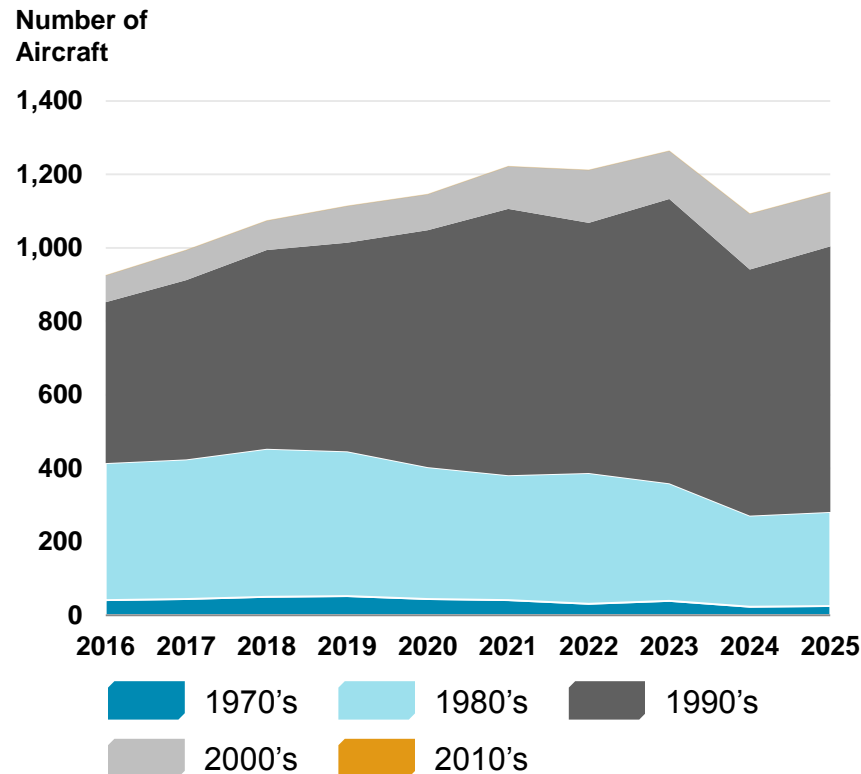
2016-2026 Global Fleet Forecast by Aircraft Usage



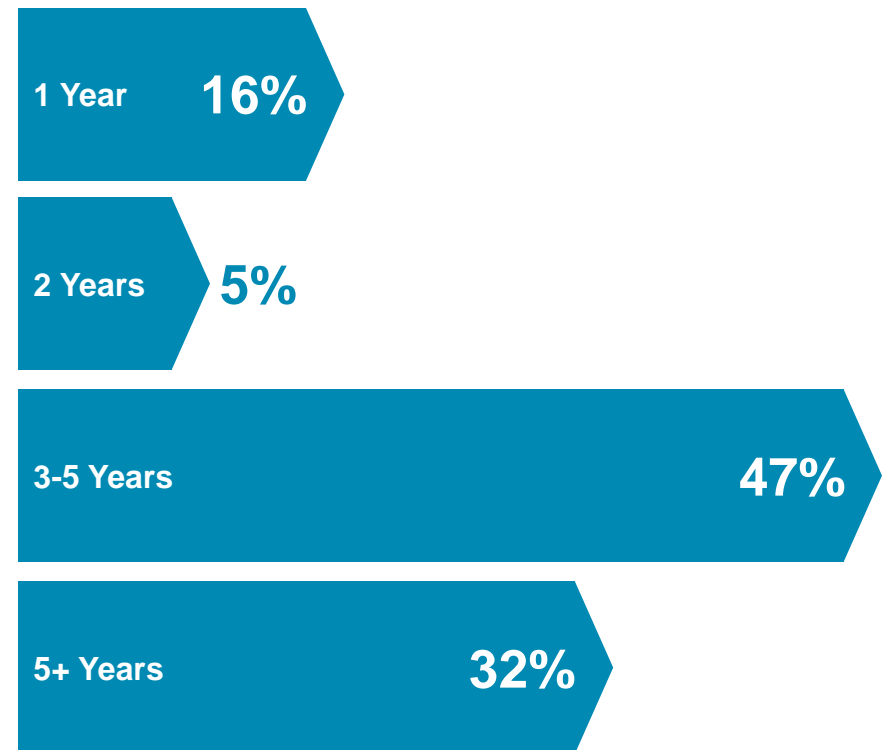
The cargo fleet will always play an important role in air service, but it's relative share of the fleet will decrease over the next decade. New generation passenger aircraft offer more cargo space, and competition from ships, trucks, and trains is mounting.

Nearly half of the current global fleet is forecast to retire by 2026 with the majority of those being of 1990s vintage. In light of this, we asked operators about their retirement planning

2016-2025 Global Aircraft Retirement Forecast
by Aircraft Vintage



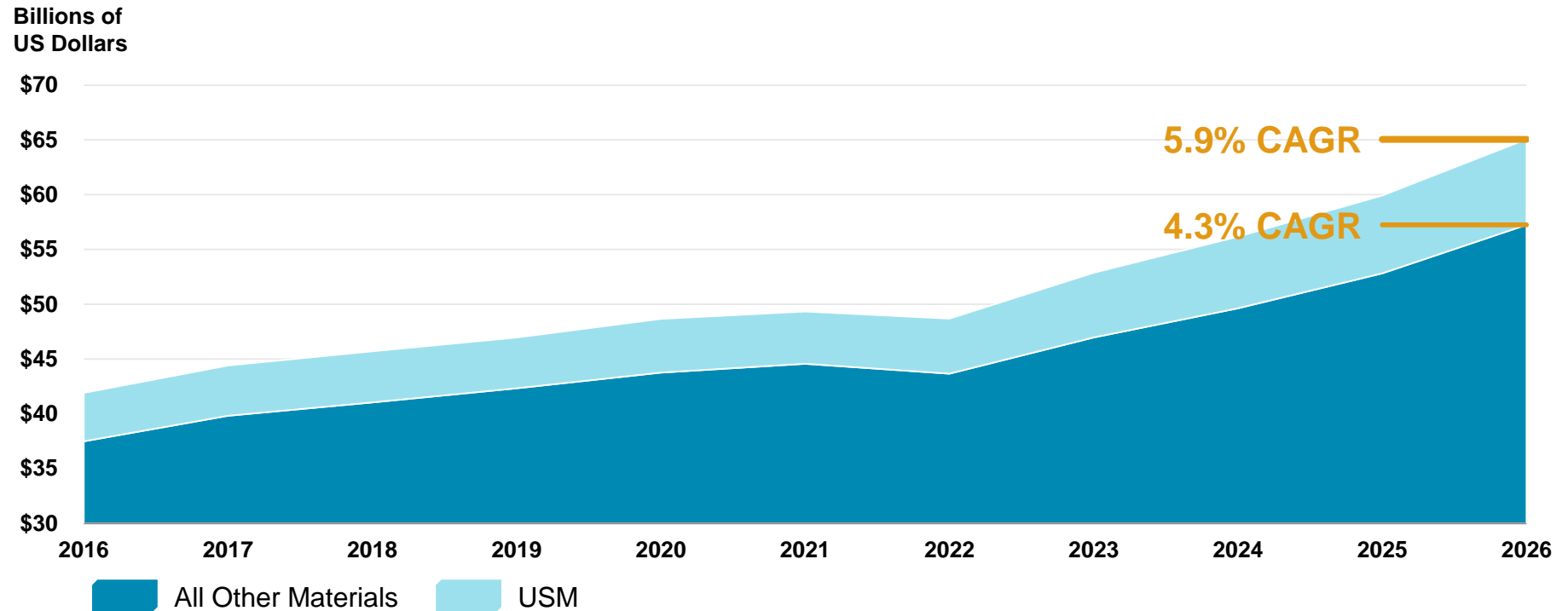
Q: When does your organization start planning for a fleet retirement?



Nearly 80% reported that retirements are planned at least three years in advance, indicating that short-term industry events are not influencing retirement schedules

Record increases in retirements are expected to have a significant impact on the availability and use of used serviceable material over the next decade

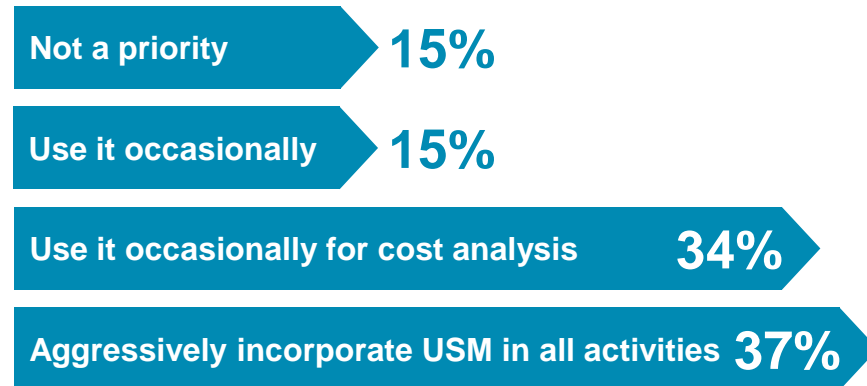
2016-2026 Global Materials Market Forecast USM vs All Other Materials



Greater utilization of USM material, particularly in 1990's vintage aircraft, will impact material pricing, and may reduce the cost of an engine shop visit by 10%-20%

Though growing, the USM market is not without challenges. OEMs are currently the largest customers of USM, and it is expected that their control of the market will continue to grow as they look to regain material pricing power

Q: What is your current activity or near team (next 12 months) plan to purchase used serviceable material (USM) for aircraft maintenance in lieu of purchasing new or repairing an existing part?

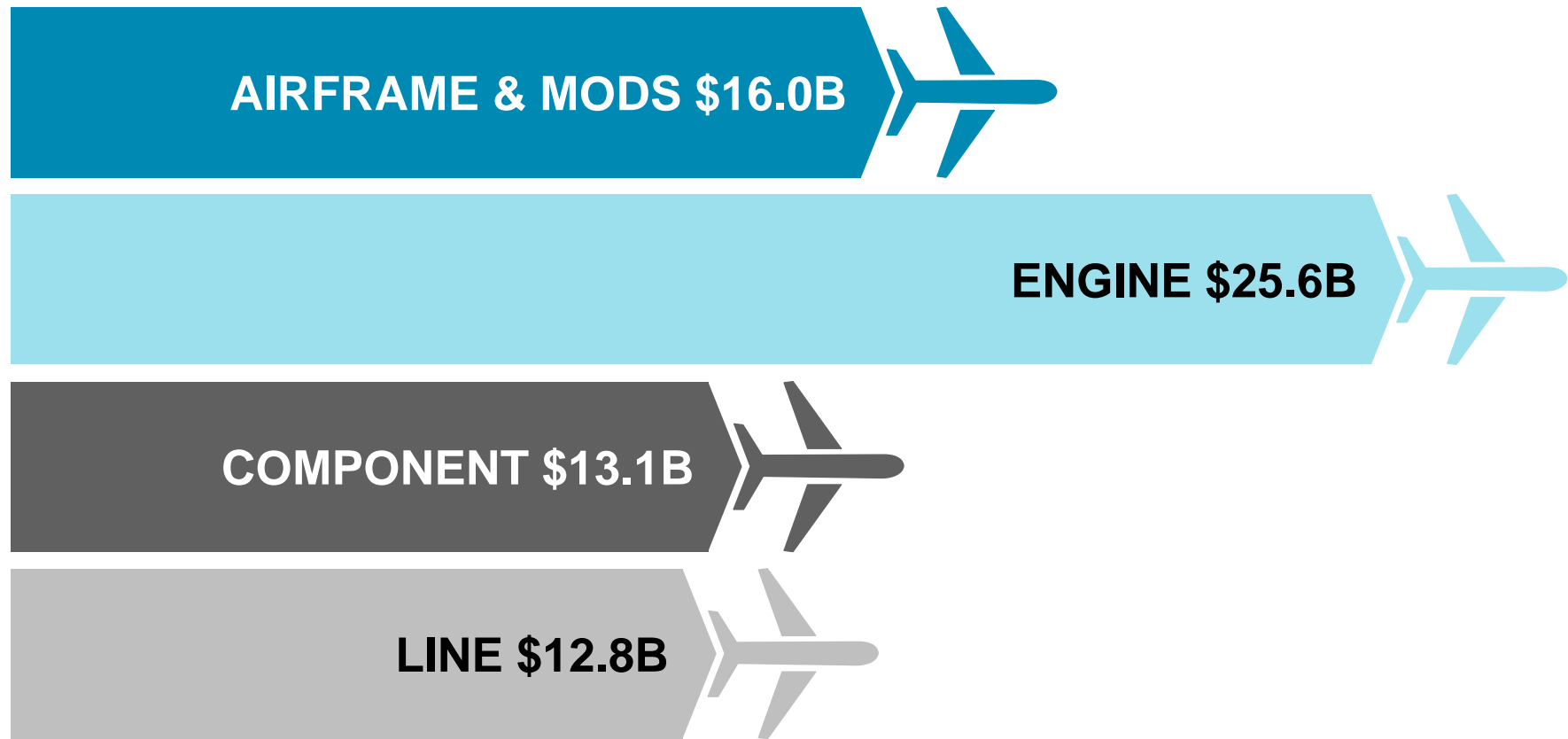


Q: In five years, who will exert the greatest control over the surplus market?



Translating the fleet dynamics into MRO, we forecast the 2016 global commercial MRO market to be \$67.7B

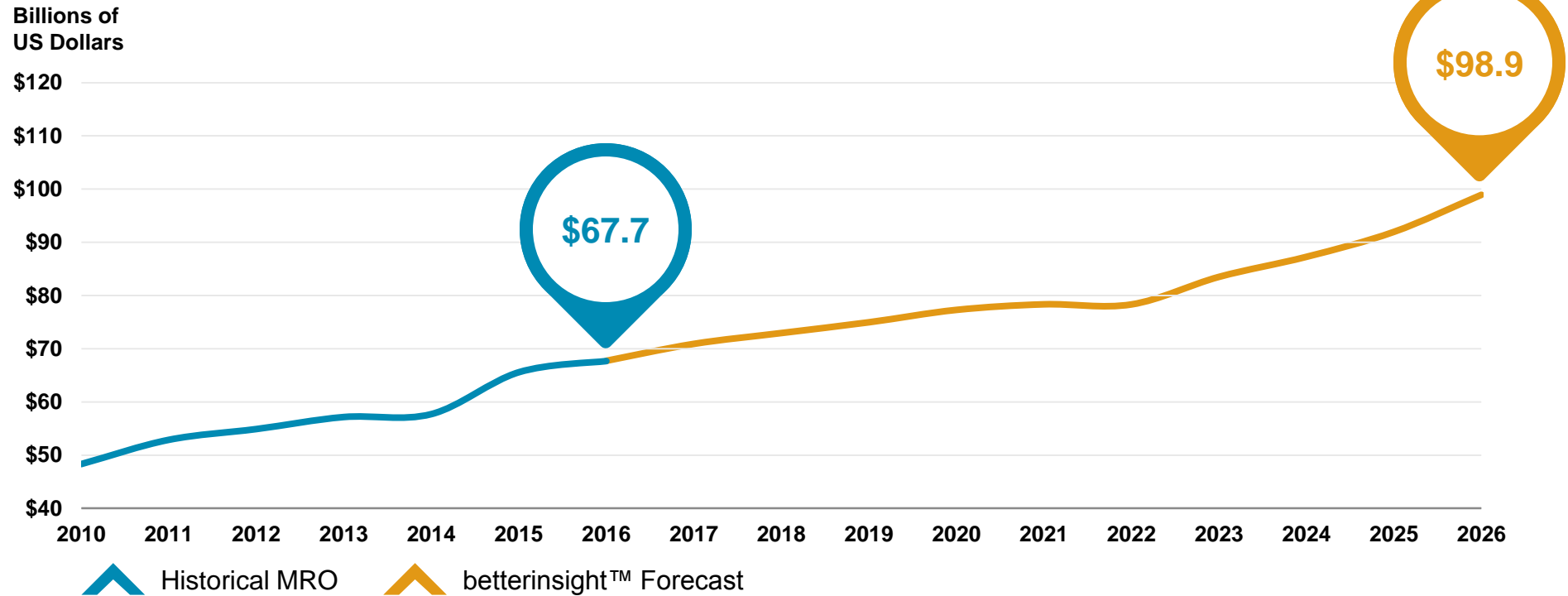
2016 Global MRO Market Forecast
by MRO Segment



Engine MRO continues to be the driver of growth in the market

As MRO is a product of the size, complexion, and utilization of the fleet, the market should continue to grow at a robust pace, weathering all but the most traumatic economic shifts

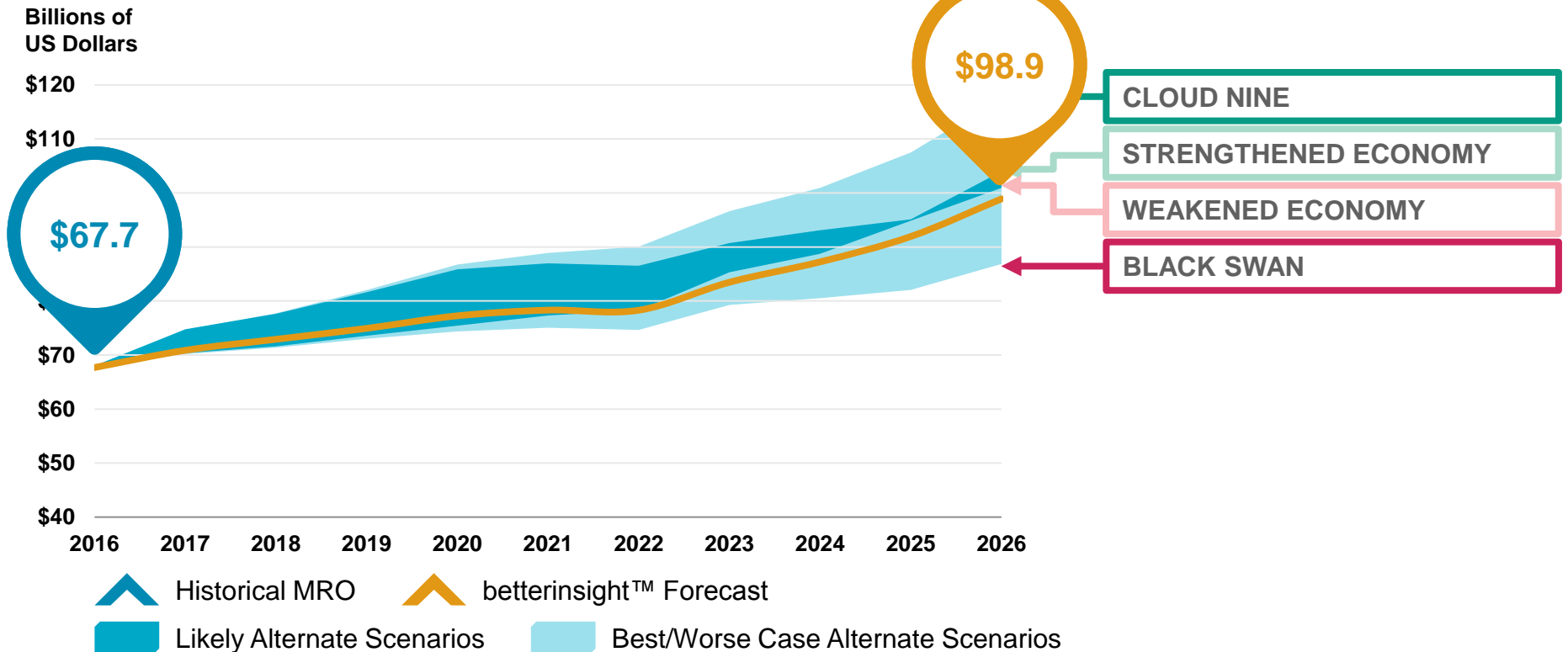
Global MRO Market Forecast by Year



We forecast total MRO spend to increase by over \$31 billion by 2026, which would represent a year-over-year increase of 3.9%

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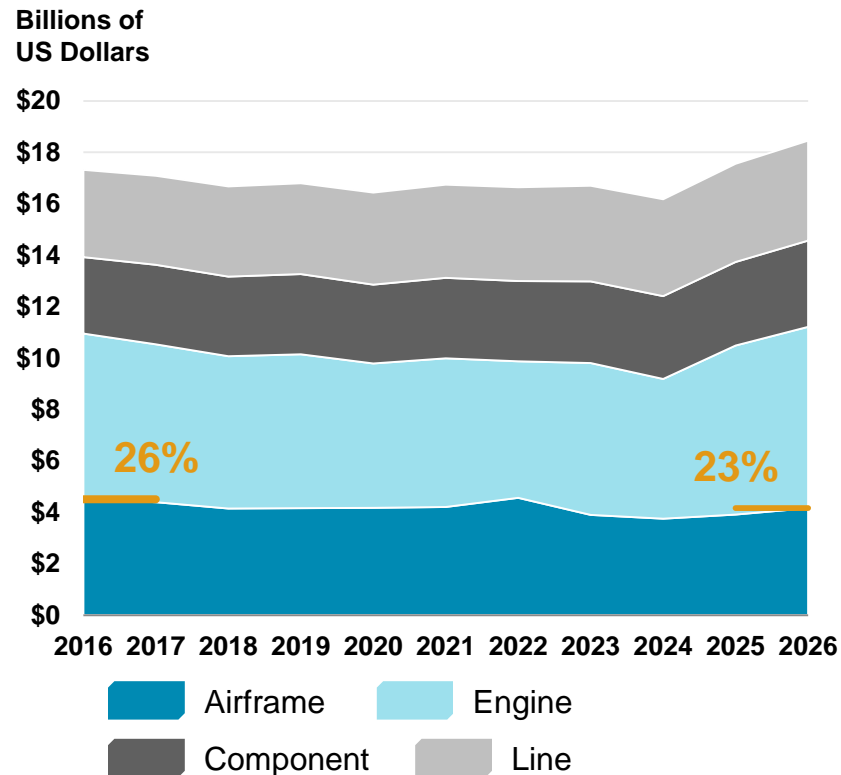
Global MRO Market Forecast by Year



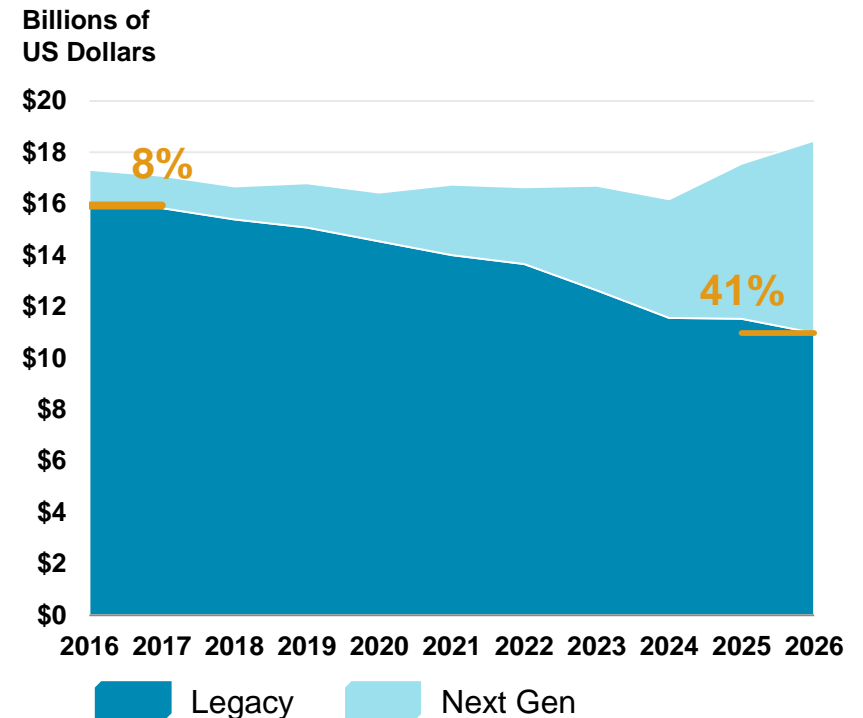
The uncertainty surrounding global economic conditions, while adversely impacting the size of the global fleet, could benefit the MRO Market

When singling out Western Europe the picture looks quite different. The region's fleet is forecast to have an average annual growth rate of just 1.6%

2016-2026 Western Europe MRO Market Forecast by MRO Segment



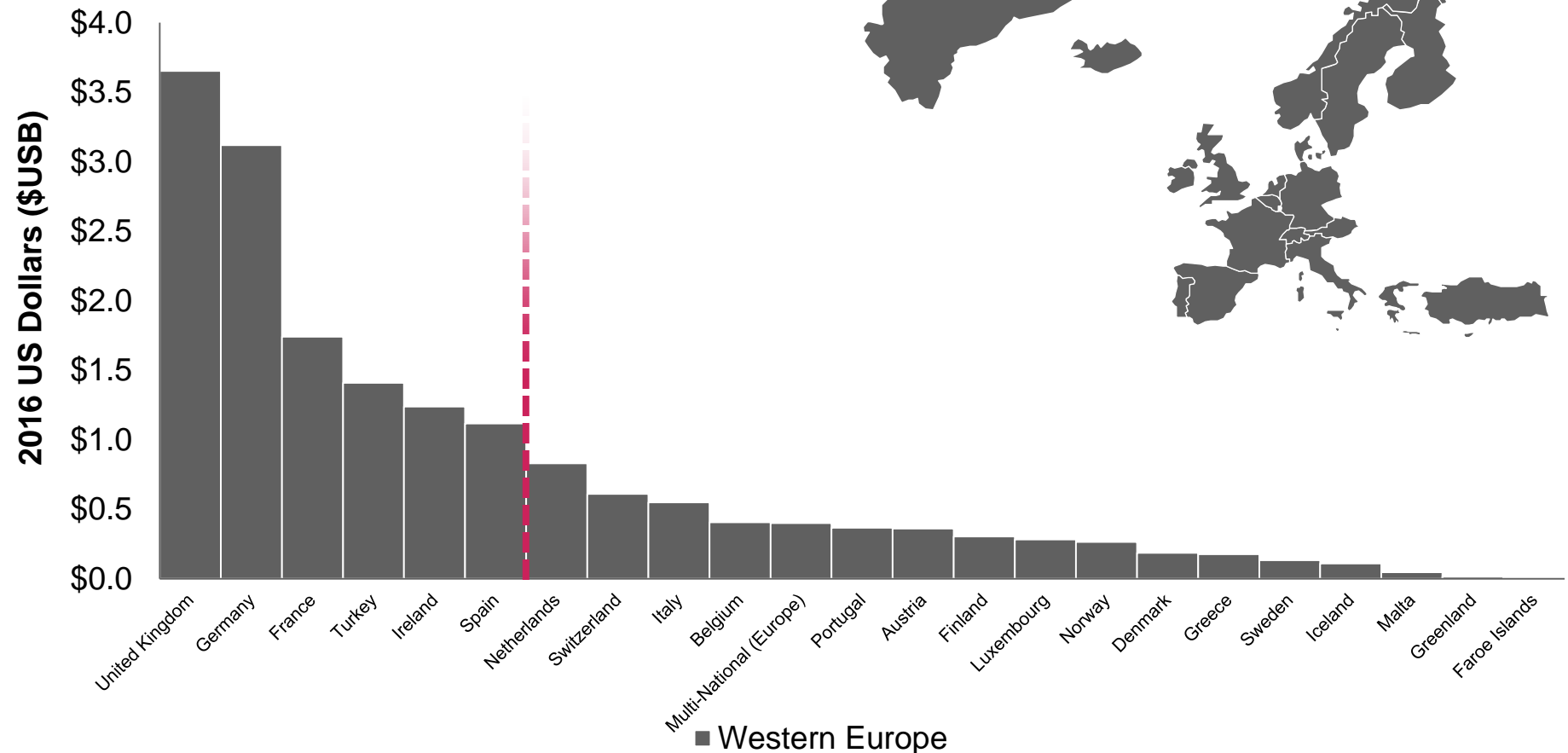
2016-2026 Western Europe MRO Market Forecast Next Gen vs Legacy



Additionally, the influx of new-build next generation aircraft, and the systematic elimination of aging fleets is expected to cause stagnation in the MRO Market

Many different dynamics are at play in a region comprised of 23 countries and states; differences in individual economies and resource availability will produce uneven growth in the region

2016 Western Europe MRO Market Forecast
by Operator Country





The image features a dark grey silhouette map of Europe and Turkey. Three callout boxes with black borders and white backgrounds are overlaid on the map. The first box is positioned over the United Kingdom, the second over France and Germany, and the third over Turkey and Greece. Each box contains text detailing fleet sizes, MRO markets, and regional challenges.

United Kingdom

- Fleet Size: 924
- MRO Market: \$3.7B

BREXIT has caused an enormous amount of uncertainty in the UK and Western European commercial aviation markets. BREXIT is likely to lead to lower traffic volumes, lower levels of trade, and a weaker GDP outlook in the UK in the near term. Long term ramifications are still being debated and will not be known until the UK's political situation is made more clear.

France & Germany

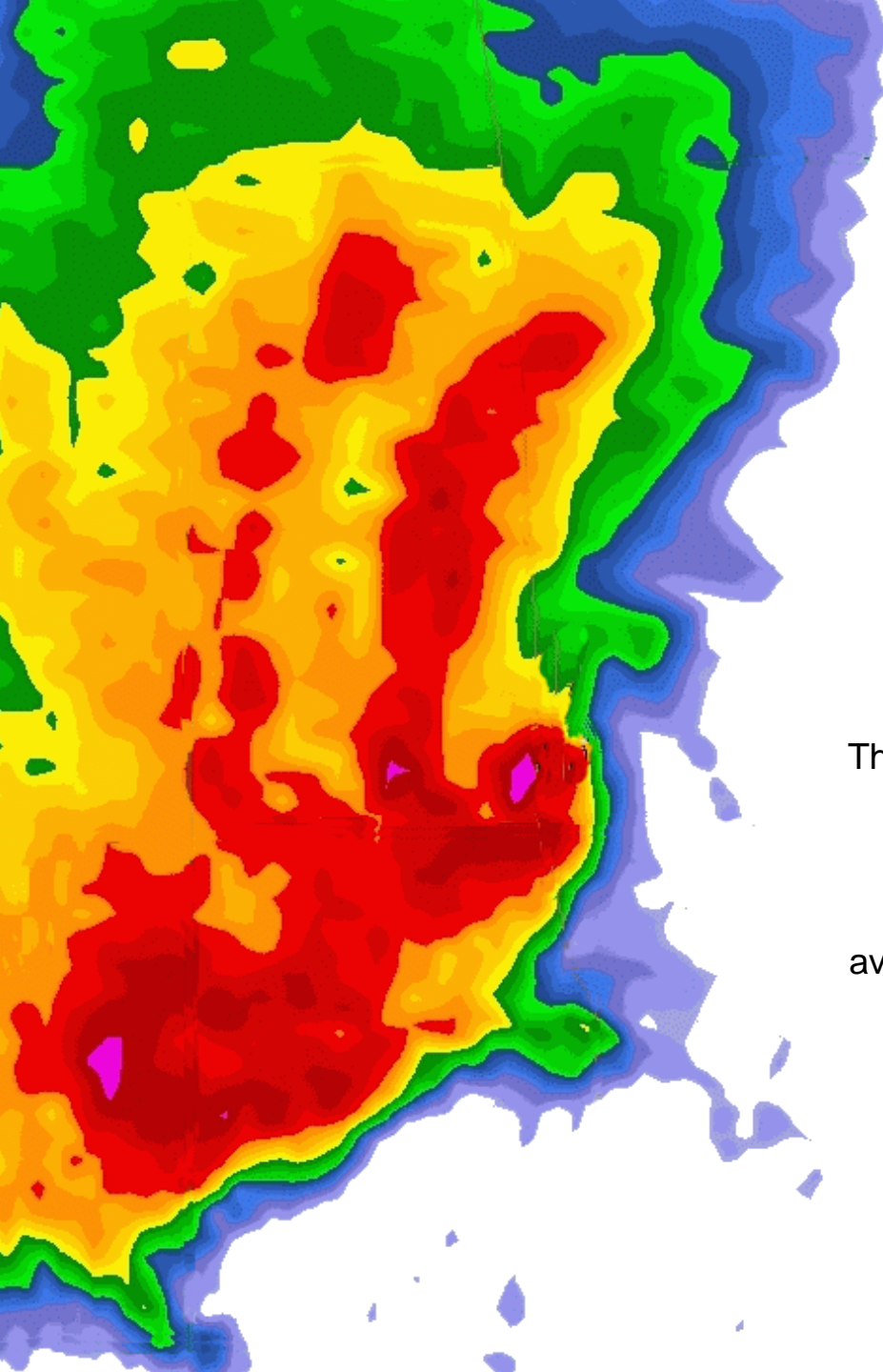
- Combined Fleet Size: 1,125
- Combined MRO Market: \$4.9B

Terrorist attacks, in combination with frequent labor strikes, threaten to slow growth within the heart of Western Europe.

Turkey & Greece

- Combined Fleet Size: 539
- Combined MRO Market: \$1.6B

Terrorist attacks, increasing in severity, along with the upheaval caused by the recent coup attempt will drastically slow air traffic, and international trade with Turkey. Greece, already weak, may soon be affected by fleeing refugees.



Take the controls and make strategic investments now:

New technology aircraft are creating unprecedented needs for data analysis



The mature markets are stagnating, and the nexus of MRO is shifting to Asia



The regional jet and turboprop markets will decline as operators upgauge to narrowbodies



Increased retirements will lead to greater availability and use of USM, which will significantly impact MRO costs



Price and customer service are the driving levers to compete in a stagnant MRO market



